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Title : An integrated ecological approach to mapping marine mammal habitat in the Bahamas, using LandSat 7 imagery

Category : Ecology

Student :

Preferred Format : Either Oral or Poster Presentation

Abstract : The analysis of habitat utilization by marine mammals has benefited greatly through recent advances in GIS, GPS and other satellite technologies. This groundbreaking project uses habitat mapping via LandSat 7 imagery to develop a database of marine benthic communities and associated near-shore habitat types, in an established marine mammal study area. Due to the clear, shallow waters, and the extensive marine mammal data collected through various research efforts, the Bahama Banks were especially suitable for this application. NOAA's National Marine and Estuarine Classification scheme (Alee, et al, 2000) was expanded to include ten regional marine substrate distinctions including grass beds, bare sand, hard bottom, mud, reef and stony coral habitats. The traditional process of ground truthing was used to verify these habitat classifications in the field, and each location was geo-rectified using handheld GPS transmitters. Through remote sensing techniques, sample locations of each habitat type were collected from a series of consistently projected, calibrated, and band specified LandSat 7 images. These satellite images were selected to represent suitably cloudless summer days consistent with field data collection conditions. Ground truth and remote sensed data were then combined, using ERDAS imagine software, to model the classification scheme over large coastal and near-shore sectors. In the resulting raster-based visual representation, each habitat type is delineated by colorized polygons, which can be accessed with ESRI ArcView (or other) GIS software packages and applied to species data. Marine mammal data, collected in the area, were layered over these bitmaps to facilitate analysis of spatial distribution and habitat preferences in relation to behavior and social structure. Future applications include analysis of habitat type in relation to prey availability, diversity, and density. These maps will provide baseline information useful in long-term analysis of habitat change and address management issues, such as habitat fragmentation and people-environmental interaction.